

What is claimed is:

1. An access control apparatus which processes a plurality of access requests to a storage medium, comprising:

5 a scheduling unit determining a deadline of an accessing process depending on a change of a data transfer rate, and setting an execution schedule for the plurality of access requests in order from a process having an earliest deadline; and

10 a control unit controlling execution of the access requests according to the execution schedule.

2. The apparatus according to claim 1, wherein

15 said scheduling unit determines a deadline of a reading process according to information about a deadline of writing read data in response to a request to read data from the storage medium.

20 3. The apparatus according to claim 1, wherein

said control unit comprises a buffer unit for buffering only valid data excluding dummy data as write data in received data when said control unit receives a request to write data to the storage medium, and said scheduling unit determines a

25

deadline of a writing process based on a time required by said buffer unit to buffer the valid data in a predetermined area.

5        4.     The apparatus according to claim 3, wherein  
         said control unit controls information about  
         the deadline of the writing process to be written  
         in the storage medium together with the write data.

10       5.     The apparatus according to claim 3, wherein  
         upon receipt of the request to read data from  
         the storage medium, said control unit adds the  
         dummy data to the read data based on a transfer  
         order of the dummy data and the valid data when the  
15       read data is written.

6.     An access control apparatus which processes a  
plurality of access requests to a disk type storage  
medium, comprising:

20       a determination unit determining a write area  
         such that a plurality of write positions can be  
         close to each other in response to a plurality of  
         write requests to write data to the storage medium;  
         and

25       a control unit controlling a process of

sequentially writing write data to the write area specified by each write request.

7. The apparatus according to claim 6, wherein  
5 said determination unit determines the write area based on at least one of a number of the write requests and a total transfer rate of the plurality of write requests.

10 8. A method for controlling access in processing a plurality of access requests to a storage medium, comprising:

determining a deadline of an accessing process depending on a change of a data transfer rate;

15 setting an execution schedule for the plurality of access requests in order from a process having an earliest deadline; and

controlling execution of the access requests according to the execution schedule.

20 9. A method for controlling access in processing a plurality of access requests to a disk type storage medium, comprising:

determining a write area such that a plurality  
25 of write positions can be close to each other in

response to a plurality of write requests to write data to the storage medium; and

controlling a process of sequentially writing write data to the write area specified by each write request.

5

10. A computer-readable storage medium storing a program used with a processing device for processing a plurality of access requests to a storage medium to direct a computer to perform the steps of:

10

determining a deadline of an accessing process depending on a change of a data transfer rate;

setting an execution schedule for the plurality of access requests in order from a process having an earliest deadline; and

15

controlling execution of the access requests according to the execution schedule.

11. A computer-readable storage medium storing a program used with a processing device for processing a plurality of access requests to a storage medium to direct a computer to perform the steps of:

20

determining a write area such that a plurality

25

of write positions can be close to each other in response to a plurality of write requests to write data to the storage medium; and

controlling a process of sequentially writing  
5 write data to the write area specified by each write request.

12. An access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a storage medium whose  
10 revolution is controlled based on a ZCAV system, comprising:

a selection unit selecting a plurality of zones from the storage medium such that transfer speeds of the zones on the storage medium can be  
15 leveled; and

a control unit controlling data through the plurality of channels such that the data can be distributed and recorded in the plural selected  
20 zones.

13. An access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a storage medium whose  
25 revolution is controlled based on a ZCAV system,

comprising:

a selection unit selecting a plurality of zones having a transfer speed average higher than general request performance as a sum of data storage request performance of data of each channel from the storage medium; and

a control unit controlling data to be distributed and recorded through the plurality of channels to the selected plural zones.

14. An access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a storage medium whose revolution is controlled based on a ZCAV system, comprising:

a selection unit selecting an outer zone having a larger storage capacity by priority when simultaneous record requests are received through a plurality of channels; and

a control unit controlling data to be recorded with the plurality of channels with concentration on the selected zones.

15. An access control apparatus which controls a process of simultaneously recording data through a

plurality of channels in a storage medium in a land/groove system, comprising:

5 a determination unit determining land or groove on which the data of each channel is recorded one to one when simultaneous storage requests are received through a plurality of channels; and

10 a control unit controlling the data of each channel to be distributed and recorded through corresponding determined land or groove.

16. The apparatus according to claim 15, wherein  
when said storage medium is divided into logical zones having the land and the groove of a predetermined number of sectors, said control unit  
15 controls data through each channel to be distributed and recorded in logical zone units alternately on the land and the groove.

20 17. The apparatus according to claim 16, further comprising:

a deletion unit deleting data of a channel from the land or the groove on which the data is recorded when a request to delete the data of the  
25 channel is accepted; and

a garbage collection unit moving data of another channel recorded on another land or groove associated with the land or the groove to a logical zone having an empty area for a rewrite operation.

5

18. The apparatus according to claim 15, further comprising

a read unit reading data from the land or groove on which data of a channel is recorded when  
10 a request to read the data of the channel is accepted.

19. A method for controlling a process of simultaneously recording data through a plurality  
15 of channels in a storage medium whose revolution is controlled based on a ZCAV system, comprising:

selecting a plurality of zones from the storage medium such that transfer speeds of the zones on the storage medium can be leveled; and  
20 controlling data through the plurality of channels such that the data can be distributed and recorded in the plural selected zones.

20. A method for controlling a process of  
25 simultaneously recording data through a plurality



of channels in a storage medium whose revolution is controlled based on a ZCAV system, comprising:

selecting a plurality of zones having a transfer speed average higher than general request performance as a sum of data storage request performance of data of each channel from the storage medium; and

controlling data to be distributed and recorded through the plurality of channels to the selected plural zones.

21. A method for controlling a process of simultaneously recording data through a plurality of channels in a storage medium whose revolution is controlled based on a ZCAV system, comprising:

selecting an outer zone having a larger storage capacity by priority when simultaneous record requests are received through a plurality of channels; and

controlling data to be recorded with the plurality of channels with concentration on the selected zones.

22. A method for controlling a process of simultaneously recording data through a plurality

of channels in a storage medium in a land/groove system, comprising:

determining land or groove on which the data of each channel is recorded one to one when simultaneous storage requests are received through a plurality of channels; and

controlling the data of each channel to be distributed and recorded through corresponding determined land or groove.

23. A computer-readable storage medium storing a program for use with an access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a disk type storage medium whose revolution is controlled by a ZCAV system to direct a computer to perform the steps of:

selecting a plurality of zones from the disk type storage medium such that transfer speeds of the zones on the disk type storage medium can be leveled; and

controlling data through the plurality of channels such that the data can be distributed and recorded in the plural selected zones.

24. A computer-readable storage medium storing a program for use with an access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a disk type storage medium whose revolution is controlled by a ZCAV system to direct a computer to perform the steps of:

selecting a plurality of zones having a transfer speed average higher than general request performance as a sum of data storage request performance of data of each channel from the storage medium; and

controlling data to be distributed and recorded through the plurality of channels to the selected plural zones.

25. A computer-readable storage medium storing a program for use with an access control apparatus which controls a process of simultaneously recording data through a plurality of channels in a disk type storage medium whose revolution is controlled by a ZCAV system to direct a computer to perform the steps of:

selecting an outer zone having a larger storage capacity by priority when simultaneous



plurality of number of sectors, said computer is directed to control data of each channel to be distributed and recorded in logical zone units alternately on a land and a groove.